Abstract

In this thesis, we studied the longitudinal electron wave following Fermi-Dirac. Particle under study were fermions and we derived the dispersion relation for the wave of such kind by using Valsov-Maxwell equations. Finite temperature effects were studied in the arbitrary temperature degeneracy region. Such types of plasma environments occur in compact astrophysical objects, neutron stars and in laser matter interactions. Dynamics of the spherical symmetry isolated system is studied in the three regions, i.e. strongly degenerate, weakly degenerate and non-degenerate. Present study also found some valuable applications in the field of semiconductor plasma technology.